



JENNIFER M. GRANHOLM  
GOVERNOR

STATE OF MICHIGAN  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
LANSING



STEVEN E. CHESTER  
DIRECTOR

December 14, 2007

Mr. Jonathan C. Cherry, P.E.  
Manager of Environment & Government Affairs  
Kennecott Eagle Minerals Company  
1004 Harbor Hills Drive, Suite 103  
Marquette, Michigan 49855

Dear Mr. Cherry:

This letter is in reference to your Permit to Install application identified as No. 50-06 (State Registration Number N7581) for the installation and operation of a nickel and copper ore mine with associated processing equipment located in Michigamme Township, Marquette County, Michigan.

The 78-day public comment period ended on October 17, 2007, and public hearings were held on September 10–13, 2007 and September 19, 2007. Comments were received during the comment period and at the public hearings.

After careful consideration of the issues and pursuant to the delegation of authority from the Director of the Michigan Department of Environmental Quality (MDEQ), I have approved Permit to Install No. 50-06. As a part of this approval, staff has revised and added conditions to the permit to address certain information received during the public participation process and the subsequent analysis of that information.

The MDEQ Air Quality Division (AQD), along with the MDEQ's Office of Geological Survey and Water Bureau, has prepared the enclosed Response to Comments Document, which provides responses to comments received during the public comment period and at the public hearing. It also identifies the special conditions that have been modified and provides our rationale for the modifications.

This approval is based upon and subject to compliance with all administrative rules of the MDEQ and conditions stipulated in the enclosed supplement. Please review these conditions thoroughly so that you may take the actions necessary to ensure compliance with all of these conditions.

Please contact Mr. Mark C. Mitchell, AQD, at 517-373-7077 if you have any questions regarding the air use permit, or you may contact me.

Sincerely,

G. Vinson Hellwig, Chief  
Air Quality Division  
517-373-7069

Enclosures

cc/enc: Mayor Jerry Irby, City of Marquette  
Ms. Connie M. Branam, Marquette County Clerk  
Ms. Pamela Blakley, U.S. Environmental Protection Agency, Region 5  
Ms. Laura Cossa, U.S. Environmental Protection Agency, Region 5  
Ms. Andrea Martin, Foth Infrastructure & Environment, LLC  
Mr. Brian Brady, MDEQ  
Mr. Mark C. Mitchell, MDEQ



## MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY - AIR QUALITY DIVISION

## PERMIT TO INSTALL APPLICATION

For authority to install, construct, reconstruct, relocate, or modify process, fuel-burning or refuse burning equipment and/or control equipment. Permits to install are required by administrative rules pursuant to Section 5505 of 1994 PA 451, as amended.

FOR DEQ USE
APPLICATION NUMBER
50-06

Please type or print clearly. The "Application Instructions" and "Information Required for an Administratively Complete Permit to Install Application" are available on the AQD Permit Web Page at <http://www.deq.state.mi.us/aps>, or contact the Air Quality Division at 517-373-7023.

RECEIVED

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AIR QUALITY DIV.

See Appendix A, Figure 2-1 for site location

1. FACILITY CODES: State Registration Number (SRN) and North American Industry Classification System (NAICS)																																
SRN	N 1 5 8 1	NAICS 2 1 2 2 3 4																														
2. APPLICANT NAME: (Business License Name of Corporation, Partnership, Individual Owner, Government Agency) Kennecott Eagle Minerals Company																																
3. APPLICANT ADDRESS: (Number and Street) 1004 Harbor Hills Dr. Ste 103		MAIL CODE:																														
CITY: (City, Village or Township) Marquette	STATE: MI	ZIP CODE: 49855																														
4. EQUIPMENT OR PROCESS LOCATION: (Number and Street - if different than Item 3) Geographic location: 46° 44' 54" N 87° 53' 43" W																																
CITY: (City, Village or Township) Michigamme Township	ZIP CODE: 49861	COUNTY: Marquette																														
5. GENERAL NATURE OF BUSINESS: Nickel and Copper Mining																																
6. EQUIPMENT OR PROCESS DESCRIPTION: (A Description MUST Be Provided Here. Include Emission Unit IDs. Attach additional sheets if necessary.) The mining operation extracts ore from an underground ore body. The following is a list of proposed emitting equipment: <table border="1"><thead><tr><th></th><th>SCC Code</th><th>Emission Unit</th></tr></thead><tbody><tr><td>3 Diesel-fired generators</td><td>20200102</td><td>EUGENERATOR1, EUGENERATOR2, EUGENERATOR3</td></tr><tr><td>4 Propane-fired mine heaters</td><td>10500110</td><td>EUMINEHEATER1, EUMINEHEATER2, EUMINEHEATER3, EUMINEHEATER4</td></tr><tr><td>1 Crusher</td><td>30302405</td><td>EUCRUSHER</td></tr><tr><td>4 Storage bins and silos</td><td>30503813</td><td>EUCOB1, EUCOB2, EUCEMENTSILLO, EUFLYASHSILO</td></tr><tr><td>2 Grizzly</td><td>30502003</td><td>EUGRIZZLYAG, not assigned</td></tr><tr><td>1 Rockbreaker</td><td>30302405</td><td>EUROCKBREAKER</td></tr><tr><td>- Material Handling</td><td>30302408</td><td>EUFUGITIVE</td></tr><tr><td>- Storage Piles</td><td>n/a</td><td>EUFUGITIVE</td></tr><tr><td>- Vehicle travel</td><td>n/a</td><td>EUFUGITIVE</td></tr></tbody></table>				SCC Code	Emission Unit	3 Diesel-fired generators	20200102	EUGENERATOR1, EUGENERATOR2, EUGENERATOR3	4 Propane-fired mine heaters	10500110	EUMINEHEATER1, EUMINEHEATER2, EUMINEHEATER3, EUMINEHEATER4	1 Crusher	30302405	EUCRUSHER	4 Storage bins and silos	30503813	EUCOB1, EUCOB2, EUCEMENTSILLO, EUFLYASHSILO	2 Grizzly	30502003	EUGRIZZLYAG, not assigned	1 Rockbreaker	30302405	EUROCKBREAKER	- Material Handling	30302408	EUFUGITIVE	- Storage Piles	n/a	EUFUGITIVE	- Vehicle travel	n/a	EUFUGITIVE
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- Storage Piles	n/a	EUFUGITIVE																														
- Vehicle travel	n/a	EUFUGITIVE																														
7. REASON FOR APPLICATION: (Check all that apply.) <input checked="" type="checkbox"/> INSTALLATION / CONSTRUCTION OF NEW EQUIPMENT OR PROCESS <input type="checkbox"/> RECONSTRUCTION / MODIFICATION / RELOCATION OF EXISTING EQUIPMENT OR PROCESS - DATE INSTALLED: <input type="checkbox"/> OTHER - DESCRIBE																																
8. IF THE EQUIPMENT OR PROCESS THAT WILL BE COVERED BY THIS PERMIT TO INSTALL (PTI) IS CURRENTLY COVERED BY ANY ACTIVE PERMITS, LIST THE PTI NUMBER(S): n/a																																
9. DOES THIS FACILITY HAVE AN EXISTING RENEWABLE OPERATING PERMIT (ROP)? <input checked="" type="checkbox"/> NOT APPLICABLE <input type="checkbox"/> PENDING APPLICATION <input type="checkbox"/> YES PENDING APPLICATION OR ROP NUMBER:																																
10. AUTHORIZED EMPLOYEE: Jonathan C. Cherry	TITLE: Manager, Env. & Govern'l Affairs	PHONE NUMBER: (Include Area Code) 906-225-5791																														
SIGNATURE:	DATE: 2-20-06	E-MAIL ADDRESS: cherryj@kennecott.com																														
11. CONTACT: (If different than Authorized Employee. The person to contact with questions regarding this application) n/a		PHONE NUMBER: (Include Area Code)																														
CONTACT AFFILIATION:		E-MAIL ADDRESS:																														
12. IS THE CONTACT PERSON AUTHORIZED TO NEGOTIATE THE TERMS AND CONDITIONS OF THE PERMIT TO INSTALL? <input type="checkbox"/> YES <input type="checkbox"/> NO																																
FOR DEQ USE ONLY - DO NOT WRITE BELOW																																
DATE OF RECEIPT OF ALL INFORMATION REQUIRED BY RULE 203: 11-5-07																																
DATE PERMIT TO INSTALL APPROVED: 12-14-07	SIGNATURE:																															
DATE APPLICATION VOIDED:	SIGNATURE:																															
DATE APPLICATION DENIED:	SIGNATURE:																															
A PERMIT CERTIFICATE WILL BE ISSUED UPON APPROVAL OF A PERMIT TO INSTALL																																

EQP 5615E (Rev. 09/2004)

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY  
AIR QUALITY DIVISION**

December 14, 2007

**PERMIT TO INSTALL  
50-06**

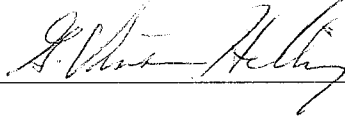
**ISSUED TO**  
Kennecott Eagle Minerals Company

**LOCATED AT**  
Michigamme Township  
Marquette County

**IN THE COUNTY OF**  
Marquette

**STATE REGISTRATION NUMBER**  
N7581

The Air Quality Division has approved this Permit to Install, pursuant to the delegation of authority from the Michigan Department of Environmental Quality. This permit is hereby issued in accordance with and subject to Section 5505(1) of Article II, Chapter I, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Pursuant to Air Pollution Control Rule 336.1201(1), this permit constitutes the permittee's authority to install the identified emission unit(s) in accordance with all administrative rules of the Department and the attached conditions. Operation of the emission unit(s) identified in this Permit to Install is allowed pursuant to Rule 336.1201(6).

DATE OF RECEIPT OF ALL INFORMATION REQUIRED BY RULE 203: <b>November 5, 2007</b>	
DATE PERMIT TO INSTALL APPROVED: <b>December 14, 2007</b>	SIGNATURE: <b>G. Vinson Hellwig</b> 
DATE PERMIT VOIDED:	SIGNATURE:
DATE PERMIT REVOKED:	SIGNATURE:

## PERMIT TO INSTALL

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**Common Abbreviations / Acronyms**

Common Acronyms		Pollutant/Measurement Abbreviations	
AQD	Air Quality Division	Btu	British Thermal Unit
BACT	Best Available Control Technology	°C	Degrees Celsius
CAA	Clean Air Act	CO	Carbon Monoxide
CEM	Continuous Emission Monitoring	dscf	Dry standard cubic foot
CFR	Code of Federal Regulations	dscm	Dry standard cubic meter
COM	Continuous Opacity Monitoring	°F	Degrees Fahrenheit
EPA	Environmental Protection Agency	gr	Grains
EU	Emission Unit	Hg	Mercury
FG	Flexible Group	hr	Hour
GACS	Gallon of Applied Coating Solids	H <sub>2</sub> S	Hydrogen Sulfide
GC	General Condition	hp	Horsepower
HAP	Hazardous Air Pollutant	lb	Pound
HVLP	High Volume Low Pressure *	m	Meter
ID	Identification	mg	Milligram
LAER	Lowest Achievable Emission Rate	mm	Millimeter
MACT	Maximum Achievable Control Technology	MM	Million
MAERS	Michigan Air Emissions Reporting System	MW	Megawatts
MAP	Malfunction Abatement Plan	ng	Nanogram
MDEQ	Michigan Department of Environmental Quality	NOx	Oxides of Nitrogen
MSDS	Material Safety Data Sheet	PM	Particulate Matter
NESHAP	National Emission Standard for Hazardous Air Pollutants	PM-10	Particulate Matter less than 10 microns diameter
NSPS	New Source Performance Standards	pph	Pounds per hour
NSR	New Source Review	ppm	Parts per million
PS	Performance Specification	ppmv	Parts per million by volume
PSD	Prevention of Significant Deterioration	ppmw	Parts per million by weight
PTE	Permanent Total Enclosure	psia	Pounds per square inch absolute
PTI	Permit to Install	psig	Pounds per square inch gauge
RACT	Reasonably Available Control Technology	scf	Standard cubic feet
ROP	Renewable Operating Permit	sec	Seconds
SC	Special Condition Number	SO <sub>2</sub>	Sulfur Dioxide
SCR	Selective Catalytic Reduction	THC	Total Hydrocarbons
SRN	State Registration Number	tpy	Tons per year
TAC	Toxic Air Contaminant	µg	Microgram
TEQ	Toxicity Equivalence Quotient	VOC	Volatile Organic Compound
VE	Visible Emissions	yr	Year

\* For High Volume Low Pressure (HVLP) applicators, the pressure measured at the HVLP gun air cap shall not exceed ten (10) pounds per square inch gauge (psig).

### GENERAL CONDITIONS

1. The process or process equipment covered by this permit shall not be reconstructed, relocated, or modified, unless a Permit to Install authorizing such action is issued by the Department, except to the extent such action is exempt from the Permit to Install requirements by any applicable rule. **[R336.1201(1)]**
2. If the installation, construction, reconstruction, relocation, or modification of the equipment for which this permit has been approved has not commenced within 18 months, or has been interrupted for 18 months, this permit shall become void unless otherwise authorized by the Department. Furthermore, the permittee or the designated authorized agent shall notify the Department via the Supervisor, Permit Section, Air Quality Division, Michigan Department of Environmental Quality, P.O. Box 30260, Lansing, Michigan 48909, if it is decided not to pursue the installation, construction, reconstruction, relocation, or modification of the equipment allowed by this Permit to Install. **[R336.1201(4)]**
3. If this Permit to Install is issued for a process or process equipment located at a stationary source that is not subject to the Renewable Operating Permit program requirements pursuant to R336.1210, operation of the process or process equipment is allowed by this permit if the equipment performs in accordance with the terms and conditions of this Permit to Install. **[R336.1201(6)(b)]**
4. The Department may, after notice and opportunity for a hearing, revoke this Permit to Install if evidence indicates the process or process equipment is not performing in accordance with the terms and conditions of this permit or is violating the Department's rules or the Clean Air Act. **[R336.1201(8), Section 5510 of Act 451, PA 1994]**
5. The AQD District Supervisor shall be notified, in writing, of a change in ownership or operational control of the stationary source or emission unit(s) authorized by this Permit to Install pursuant to R336.1219. The notification shall include all of the information required by R336.1219(1)(a) and (b). In addition, a new owner or operator must submit a written statement pursuant to R336.1219(1)(c), agreeing to and accepting the terms and conditions of this Permit to Install, and shall notify the AQD District Supervisor of any change in the contact person for this Permit to Install. **[R336.1219]**
6. Operation of this equipment shall not result in the emission of an air contaminant which causes injurious effects to human health or safety, animal life, plant life of significant economic value, or property, or which causes unreasonable interference with the comfortable enjoyment of life and property. **[R336.1901]**
7. The permittee shall provide notice of an abnormal condition, start-up, shutdown, or malfunction that results in emissions of a hazardous or toxic air pollutant which continue for more than one hour in excess of any applicable standard or limitation, or emissions of any air contaminant continuing for more than two hours in excess of an applicable standard or limitation, as required in Rule 912, to the Department. The notice shall be provided not later than two business days after start-up, shutdown, or discovery of the abnormal condition or malfunction. Written reports, if required, must be filed with the Department within 10 days after the start-up or shutdown occurred, within 10 days after the abnormal conditions or malfunction has been corrected, or within 30 days of discovery of the abnormal condition or malfunction, whichever is first. The written reports shall include all of the information required in Rule 912(5). **[R336.1912]**
8. Approval of this permit does not exempt the permittee from complying with any future applicable requirements which may be promulgated under Part 55 of 1994 PA 451, as amended or the Federal Clean Air Act.

9. Approval of this permit does not obviate the necessity of obtaining such permits or approvals from other units of government as required by law nor does it affect any liability for past violations under the Natural Resources and Environmental Protection Act, 1994 PA 451.
10. Operation of this equipment may be subject to other requirements of Part 55 of 1994 PA 451, as amended and the rules promulgated thereunder.
11. Except as provided in subrules (2) and (3) or unless the special conditions of the Permit to Install include an alternate opacity limit established pursuant to subrule (4) of R336.1301, the permittee shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of density greater than the most stringent of the following. The grading of visible emissions shall be determined in accordance with R336.1303. **[R336.1301]**
  - a) A six-minute average of 20 percent opacity, except for one six-minute average per hour of not more than 27 percent opacity.
  - b) A visible emission limit specified by an applicable federal new source performance standard.
  - c) A visible emission limit specified as a condition of this permit to install.
12. Collected air contaminants shall be removed as necessary to maintain the equipment at the required operating efficiency. The collection and disposal of air contaminants shall be performed in a manner so as to minimize the introduction of contaminants to the outer air. Transport of collected air contaminants in Priority I and II areas requires the use of material handling methods specified in R336.1370(2). **[R336.1370]**
13. The Department may require the permittee to conduct acceptable performance tests, at the permittee's expense, in accordance with R336.2001 and R336.2003, under any of the conditions listed in R336.2001. **[R336.2001]**

## SPECIAL CONDITIONS

### Emission Unit Identification

<b>Emission Unit ID</b>	<b>Emission Unit Description</b>	<b>Stack Identification</b>
EUGENERATOR1	1825 kW diesel generator equipped with a selective catalytic reduction (SCR) system.	SVGEN1
EUGENERATOR2	1825 kW diesel generator equipped with a selective catalytic reduction (SCR) system.	SVGEN2
EUGENERATOR3	1825 kW diesel generator equipped with a selective catalytic reduction (SCR) system.	SVGEN3
EUMINEHEATER1	4 mmBtu per hour propane heater used to space heat the underground portion of the mine to above 32°F.	SVMINEHEATER1
EUMINEHEATER2	4 mmBtu per hour propane heater used to space heat the underground portion of the mine to above 32°F.	SVMINEHEATER2
EUMINEHEATER3	4 mmBtu per hour propane heater used to space heat the underground portion of the mine to above 32°F.	SVMINEHEATER3
EUMINEHEATER4	4 mmBtu per hour propane heater used to space heat the underground portion of the mine to above 32°F.	SVMINEHEATER4
EUROCKBREAKER	A rockbreaker mounted above the grizzly feeder is used to reduce oversized rocks entering the system. The rockbreaker is located within the crusher building. All air exhausted from the crusher building is vented through a baghouse dust collector.	SVCRUSHERBLDG
EUGRIZZLYAG	A grizzly feeder used to route coarse ore into the jaw crusher. The grizzly is located within the crusher building. All air exhausted from the crusher building is vented through a baghouse dust collector.	SVCRUSHERBLDG
EUCRUSHER	A single-toggle 30 in. by 40 in. jaw crusher equipped with a wet scrubber. The crusher is located within the crusher building and emissions from the wet scrubber will exhaust inside this building. The maximum capacity of the crusher is 2200 tons per day. All air exhausted from the crusher building is vented through a baghouse dust collector.	SVCRUSHER <sup>1</sup> SVCRUSHERBLDG
EUTRANSFERPTS	Two transfer points used to feed the crushed ore leaving the jaw crusher into the two crushed ore bins. The transfer points are located within the crusher building. All air exhausted from the crusher building is vented through a baghouse dust collector.	SVCRUSHERBLDG

Emission Unit ID	Emission Unit Description	Stack Identification
EUCOB1	A 20 foot diameter crushed ore storage bin capable of holding a maximum of 330 tons of ore. The bin is equipped with fabric filter controls which discharge back into the bin. The bin is located within the crushed ore building.	SVCOB1 <sup>2</sup>
EUCOB2	A 20 foot diameter crushed ore storage bin capable of holding a maximum of 330 tons of ore. The bin is equipped with fabric filter controls which discharge back into the bin. The bin is located within the crushed ore building.	SVCOB2 <sup>2</sup>
EUCEMENTSILO	A 120 ton capacity cement silo equipped with a bin vent fabric filter. The silo is loaded via pneumatic conveyors.	SVCEMENTSILO <sup>3</sup>
EUFLYASHSILO	A 120 ton capacity flyash silo equipped with a bin vent fabric filter. The silo is loaded via pneumatic conveyors.	SVFLYASHSILO <sup>4</sup>
EUCEMENTPLANT	Cement and flyash are discharged from their respective silos onto a screw conveyor which feeds a blender. Once blended, the mixture is discharged via a screw conveyor and rotary airlock into the borehole. This system is enclosed within a building.	NA
EUMVAR	Emissions produced by underground activities are vented through the main ventilation air raise (MVAR). The underground activities include vehicle travel, drilling, blasting, ore and development rock handling, backfill material handling and mixing, and mine heaters. The MVAR is equipped with a fabric filter system to control particulate emissions.	SVMVAR
EUFUGITIVES	Fugitive emissions are produced by vehicle traffic, storage piles, and handling and transfer of ore, development rock, and backfill material.	NA
EUTRUCKLOAD	Within the crushed ore building material from the two crushed ore storage bins is loaded into transport trucks for shipping offsite.	NA

Changes to the equipment described in this table are subject to the requirements of R336.1201, except as allowed by R336.1278 to R336.1290.

Notes:

- 1 – The wet scrubber exhaust stack exhausts back into the crusher building. All air exhausted from the crusher building is vented through a baghouse dust collector which exhausts via SVCRUSHERBLDG.
- 2 – These two bin vents discharge collected particulate back into their respective ore storage bins with exhaust venting inside the crushed ore building.
- 3 – This bin vent discharges collected particulate back into the cement silo with exhaust venting outside.
- 4 – This bin vent discharges collected particulate back into the flyash silo with exhaust venting outside.

**Flexible Group Identification**

<b>Flexible Group ID</b>	<b>Emission Units Included in Flexible Group</b>	<b>Stack Identification</b>
FGGENERATORS	EUGENERATOR1 EUGENERATOR2 EUGENERATOR3	SVGEN1 SVGEN2 SVGEN3
FGHEATERS	EUMINEHEATER1 EUMINEHEATER2 EUMINEHEATER3 EUMINEHEATER4	SVMINEHEATER1 SVMINEHEATER2 SVMINEHEATER3 SVMINEHEATER4
FGCRUSHERBLDG	EUROCKBREAKER EUGRIZZLYAG EUCRUSHER EUTRANSFERPTS	SVCRUSHERBLDG
FGNSPSLL	EUCRUSHER EUTRANSFERPTS EUCOB1 EUCOB2 EUTRUCKLOAD	SVCRUSHERBLDG SVCOB1 SVCOB2

**The following conditions apply to: FGGENERATORS**

**Emission Limits**

	Pollutant	Equipment	Limit	Time Period	Testing/ Monitoring Method	Applicable Requirements
1.1a	NO <sub>x</sub>	FGGENERATORS	188 tpy	12-month rolling time period as determined at the end of each calendar month	SC 1.13, 1.14 and the "Compliance Method" below	R336.1205(3), R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)
1.1b	Ammonia	Each generator	15 ppmvd*	Test Protocol	SC 1.8	R336.1224, R336.1225

\*ppmvd = parts per million by volume on a dry gas basis at 15 percent oxygen.

**Compliance Method:**

Test results from the most recent test shall be used to develop an emission factor in terms of pounds of pollutant per gallon of No. 2 fuel oil for the engine operating with and without the SCR system. The emission factors shall be applied to the monthly fuel use to ensure compliance with the 12-month rolling averages. A limit of 27 pounds NO<sub>x</sub> per hour shall be used until the initial stack test is performed. This limit is based on the vendor guarantee of 6.95 grams per brake horsepower-hour.

**Material Usage Limits**

- 1.2 The sulfur content of the No. 2 fuel oil shall not exceed 0.1 percent by weight. [R336.1402, R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]

**Process / Operational Limits**

- 1.3 The permittee shall operate no more than two generators at any one time. [R336.1205(3), R336.1225, R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]
- 1.4 The permittee shall not operate FGGENERATORS unless a preventative maintenance plan for the SCR systems has been approved by the AQD District Supervisor. This plan shall include a catalyst replacement schedule based on the SCR manufacturer's recommended guidelines. Modifications to this plan may be made by the permittee, and must be submitted to the AQD District Supervisor for approval. A copy of the current plan must also be maintained at the facility. Unless notified by the District Supervisor within 30 business days, the original plan and any future modified plans shall be deemed approved. [R336.1205(3), R336.1910, R336.1911, R336.1912, R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]
- 1.5 The permittee shall comply with all provisions of the federal Standards of Performance for New Stationary Sources as specified in 40 CFR Part 60 Subparts A and IIII, as they apply to FGGENERATORS. (40 CFR Part 60 Subparts A & IIII)

**Equipment**

- 1.6 The permittee shall equip and maintain each engine included in FGGENERATORS with a selective catalytic reduction system. FGGENERATORS shall not operate without the respective SCR systems for more than 13,536 total hours at full-load equivalent rate per 12-month rolling time period as determined at the end of each calendar month. [R336.1205(3), R336.1910, R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]

### **Testing**

- 1.7 Within 180 days after commencement of trial operation, the permittee shall verify NO<sub>x</sub> emission rates from one engine included in FGGENERATORS, with and without the SCR system, by testing at owner's expense, in accordance with Department requirements. The permittee shall complete the test once every five years of operation and test a different engine each five years. No less than 60 days prior to testing, the permittee shall submit a complete test plan to the AQD. The AQD must approve the final plan prior to testing. Verification of emission rates includes the submittal of a complete report of the test results to the AQD within 60 days following the last date of the test. [R336.1205(3), R336.2001, R336.2003, R336.2004, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]
- 1.8 Within 180 days after commencement of trial operation, the permittee shall verify ammonia emission rates from one engine included in FGGENERATORS, with the SCR system, by testing at owner's expense, in accordance with Department requirements. The permittee shall complete the test once every five years of operation and test a different engine each five years. No less than 60 days prior to testing, the permittee shall submit a complete test plan to the AQD. The AQD must approve the final plan prior to testing. Verification of emission rates includes the submittal of a complete report of the test results to the AQD within 60 days following the last date of the test. [R336.1224, R336.1225, R336.2001, R336.2003, R336.2004]

### **Monitoring**

- 1.9 The permittee shall monitor, in a satisfactory manner, the No. 2 fuel oil usage for FGGENERATORS on a monthly basis. [R336.1205(3), R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]

### **Recordkeeping /Reporting /Notification**

- 1.10 The permittee shall complete all required calculations in a format acceptable to the AQD District Supervisor and make them available by the 15th day of the calendar month, for the previous calendar month, unless otherwise specified in any recordkeeping, reporting or notification special condition. [R336.1205(3), R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]
- 1.11 The permittee shall keep, in a satisfactory manner, records of the maximum sulfur content in the fuel for each delivery, as required by SC 1.2. The permittee shall keep all records on file for a period of at least five years and make them available to the Department upon request. [R336.1402, R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]
- 1.12 The permittee shall keep, in a satisfactory manner, a written or electronic log of the monthly hours of operation that each engine operated without the respective SCR system and the operating load for each engine, as required by SC 1.6. The permittee shall keep all records on file for a period of at least five years and make them available to the Department upon request. [R336.1205(3), R336.1910, R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]
- 1.13 The permittee shall keep, in a satisfactory manner, monthly No. 2 fuel use records for FGGENERATORS, as required by SC 1.9. The permittee shall keep all records on file for a period of at least five years and make them available to the Department upon request. [R336.1205(3), R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]

- 1.14 The permittee shall keep, in a satisfactory manner, monthly and 12-month rolling time period NO<sub>x</sub> emission calculation records for FGGENERATORS, as required by SC 1.1a. The permittee shall keep all records on file for a period of at least five years and make them available to the Department upon request. [R336.1205(3), R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]

**Stack / Vent Restrictions**

	<b>Stack &amp; Vent ID</b>	<b>Maximum Diameter (inches)</b>	<b>Minimum Height Above Ground Level (feet)</b>	<b>Applicable Requirement</b>
1.15a	SVGEN1	24.0	55.8	R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)
1.15b	SVGEN2	24.0	55.8	R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)
1.15c	SVGEN3	24.0	55.8	R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)
The exhaust gases shall be discharged unobstructed vertically upwards to the ambient air.				

**The following conditions apply to: FGHEATERS**

**Emission Limits**

	<b>Pollutant</b>	<b>Equipment</b>	<b>Limit</b>	<b>Time Period</b>	<b>Testing/ Monitoring Method</b>	<b>Applicable Requirements</b>
2.1a	NOx	Each heater	19 lb/1000 gal	Test Protocol	GC 13	R336.1205(3), R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)
2.1b	NOx	FGHEATERS	7.3 tpy	12-month rolling time period as determined at the end of each calendar month	SC 2.1a, 2.5, 2.6	R336.1205(3), R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)

**Material Limits**

- 2.2 The propane usage for FGHEATERS shall not exceed 768,073 gallons per 12-month rolling time period as determined at the end of each calendar month. [R336.1205(3), R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]

**Monitoring**

- 2.3 The permittee shall monitor, in a satisfactory manner, the propane usage for FGHEATERS on a monthly basis. [R336.1205(3), R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]

**Recordkeeping /Reporting /Notification**

- 2.4 The permittee shall complete all required calculations in a format acceptable to the AQD District Supervisor and make them available by the 15th day of the calendar month, for the previous calendar month, unless otherwise specified in any recordkeeping, reporting or notification special condition. [R336.1205(3), R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]
- 2.5 The permittee shall keep, in a satisfactory manner, monthly fuel use records for FGHEATERS, as required by SC 2.2. The permittee shall keep all records on file for a period of at least five years and make them available to the Department upon request. [R336.1205(3), R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]
- 2.6 The permittee shall keep, in a satisfactory manner, monthly and 12-month rolling time period NOx emission calculation records for FGHEATERS, as required by SC 2.1b. The permittee shall keep all records on file for a period of at least five years and make them available to the Department upon request. [R336.1205(3), R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]

**Stack / Vent Restrictions**

2.7 The exhaust gases shall be discharged unobstructed vertically upwards to the ambient air through SVMVAR or through 4 individual stacks (SVMINEHEATER1 through SVMINEHEATER4), all which are listed below:

	Stack & Vent ID	Maximum Diameter	Minimum Height Above Ground Level (feet)	Applicable Requirement
2.7a	SVMVAR	14.1 Feet	65.0	R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)
2.7b	SVMINEHEATER1	12.0 Inches	23.0	R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)
2.7c	SVMINEHEATER2	12.0 Inches	23.0	R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)
2.7d	SVMINEHEATER3	12.0 Inches	23.0	R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)
2.7e	SVMINEHEATER4	12.0 Inches	23.0	R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)

**The following conditions apply to: FGCRUSHERBLDG**

**Emission Limits**

	<b>Pollutant</b>	<b>Equipment</b>	<b>Limit</b>	<b>Time Period</b>	<b>Testing/ Monitoring Method</b>	<b>Applicable Requirements</b>
3.1a	PM	FGCRUSHERBLDG	0.001 lbs per 1000 lbs of exhaust gases*	Test Protocol	SCs 3.5 & 3.8	R336.1205(3), R336.1331, 40 CFR Part 60 Subpart LL
3.1b	PM-10	FGCRUSHERBLDG	0.03 Pounds Per Hour	Test Protocol	SCs 3.5 & 3.8	R336.1205(3), R336.2803, R336.2804, 40 CFR 52.21 Subparts (c) & (d)
* Calculated on a dry gas basis.						

**Visible Emission Limits**

- 3.2 Visible emissions from FGCRUSHERBLDG shall not exceed a six-minute average of 5 percent opacity. [R336.1301, R336.1331, 40 CFR Part 60 Subpart LL]

**Equipment**

- 3.3 The permittee shall not operate FGCRUSHERBLDG unless the baghouse dust collector is installed, maintained, and operated in a satisfactory manner. [R336.1205(3), R336.1224, R336.1225, R336.1331, R336.1901, R336.1910, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]

**Testing**

- 3.4 Within 60 days after achieving maximum production rate on this process, but not later than 180 days after commencement of trial operation of FGCRUSHERBLDG, the permittee shall evaluate visible emissions from FGCRUSHERBLDG, as required by federal Standards of Performance for New Stationary Sources, at owner's expense, in accordance 40 CFR Part 60 Subparts A and LL. Visible emission observation procedures must have prior approval by the AQD. Verification of visible emissions includes the submittal of a complete report of opacity observations to the AQD within 45 days following the last date of the evaluation. [R 336.1301, 40 CFR Part 60 Subparts A & LL]
- 3.5 Within 60 days after achieving the maximum production rate on this process, but not later than 180 days after commencement of trial operation of FGCRUSHERBLDG, the permittee shall verify PM emission rates from FGCRUSHERBLDG, as required by federal Standards of Performance for New Stationary Sources, by testing at owner's expense, in accordance with 40 CFR Part 60 Subparts A and LL. Stack testing procedures and the location of stack testing ports shall be in accordance with the applicable federal Reference Methods, 40 CFR Part 60 Appendix A. No less than 60 days prior to testing, the permittee shall submit a complete test plan to the AQD. The AQD must approve the final plan prior to testing. Verification of emission rates includes the submittal of a complete report of the test results to the AQD within 45 days following the last date of the test. [40 CFR Part 60 Subpart LL]

**Recordkeeping /Reporting /Notification**

- 3.6 The permittee shall complete all required calculations in a format acceptable to the AQD District Supervisor and make them available by the 15th day of the calendar month, for the previous calendar month, unless otherwise specified in any recordkeeping, reporting or notification special condition. [R336.1224, R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]
- 3.7 The permittee shall keep, in a satisfactory manner, a log of the monthly hours of operation of the crusher to represent the operation of FGCRUSHERBLDG. The permittee shall keep all records on file for a period of at least five years and make them available to the Department upon request. [R336.1224, R336.1225, R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]
- 3.8 The permittee shall keep the following information on a monthly basis for FGCRUSHERBLDG:
- a) PM-10 emission calculations determining the monthly emission rate in tons per calendar month.
  - b) PM-10 emission calculations determining the annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month.

The permittee shall keep the records on file, in a format acceptable to the AQD District Supervisor, for a period of at least five years and make them available to the Department upon request.  
[R336.1205(3), R336.1224, R336.1225, R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]

**Stack / Vent Restrictions**

	Stack & Vent ID	Maximum Diameter (inches)	Minimum Height Above Ground Level (feet)	Applicable Requirement
3.9	SVCRUSHERBLDG	24.0	49.0	R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)
The exhaust gases shall be discharged unobstructed vertically upwards to the ambient air.				

**The following conditions apply to: EUCRUSHER**

**Material Limits**

- 4.1 The permittee shall not crush any asbestos tailing or waste materials containing asbestos in EUCRUSHER pursuant to the National Emission Standards for Hazardous Air Pollutants, 40 CFR Part 61, Subpart M. [R336.1224, R336.1225, R336.1901, 40 CFR Part 61 Subpart M]

**Equipment**

- 4.2 The permittee shall not operate EUCRUSHER unless the wet scrubber is installed, maintained, and operated in a satisfactory manner. [R336.1205(3), R336.1224, R336.1225, R336.1331, R336.1901, R336.1910, R336.2803, R336.2804, 40 CFR 52.21(c) and (d), 40 CFR Part 60 Subpart LL]
- 4.3 EUCRUSHER shall be located within an enclosed building. [R336.1224, R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]

**Stack / Vent Restrictions**

- 4.4 The exhaust gases from EUCRUSHER shall not be discharged to the ambient air at any time. [R336.1224, R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]

**The following conditions apply to: EUCOB1**

**Emission Limits**

	Pollutant	Equipment	Limit	Time Period	Testing/ Monitoring Method	Applicable Requirements
5.1a	PM	EUCOB1	0.01 lbs per 1000 lbs of exhaust gases*	Test Protocol	SC 5.6	R336.1205(3), R336.1331, 40 CFR Part 60 Subpart LL
5.1b	PM-10	EUCOB1	0.04 Pounds Per Hour	Test Protocol	SC 5.6	R336.1205(3), R336.2803, R336.2804, 40 CFR 52.21 Subparts (c) & (d)
* Calculated on a dry gas basis.						

**Visible Emission Limits**

- 5.2 Visible emissions from EUCOB1 shall not exceed a six-minute average of 5 percent opacity. [R336.1301, R336.1331, 40 CFR Part 60 Subpart LL]

**Equipment**

- 5.3 The permittee shall not operate EUCOB1 unless the bin vent filter is installed, maintained, and operated in a satisfactory manner. [R336.1205(3), R336.1224, R336.1225, R336.1331, R336.1901, R336.1910, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]
- 5.4 EUCOB1 shall be located within an enclosed building. [R336.1205(3), R336.1224, R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]

**Testing**

- 5.5 Within 60 days after achieving maximum production rate on this process, but not later than 180 days after commencement of trial operation of EUCOB1, the permittee shall evaluate visible emissions from EUCOB1, as required by federal Standards of Performance for New Stationary Sources, at owner's expense, in accordance 40 CFR Part 60 Subparts A and LL. Visible emission observation procedures must have prior approval by the AQD. Verification of visible emissions includes the submittal of a complete report of opacity observations to the AQD within 45 days following the last date of the evaluation. [R 336.1301, 40 CFR Part 60 Subparts A & LL]
- 5.6 Within 60 days after achieving the maximum production rate on this process, but not later than 180 days after commencement of trial operation of EUCOB1, the permittee shall verify PM emission rates from EUCOB1, as required by federal Standards of Performance for New Stationary Sources, by testing at owner's expense, in accordance with 40 CFR Part 60 Subparts A and LL. Stack testing procedures and the location of stack testing ports shall be in accordance with the applicable federal Reference Methods, 40 CFR Part 60 Appendix A. No less than 60 days prior to testing, the permittee shall submit a complete test plan to the AQD. The AQD must approve the final plan prior to testing. Verification of emission rates includes the submittal of a complete report of the test results to the AQD within 45 days following the last date of the test. [40 CFR Part 60 Subpart LL]

**Stack / Vent Restrictions**

- 5.7 The exhaust gases from EUCOB1 shall not be discharged to the ambient air at any time.  
[R336.1224, R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]

**The following conditions apply to: EUCOB2**

**Emission Limits**

	Pollutant	Equipment	Limit	Time Period	Testing/ Monitoring Method	Applicable Requirements
6.1a	PM	EUCOB2	0.01 lbs per 1000 lbs of exhaust gases*	Test Protocol	SC 6.6	R336.1205(3), R336.1331, 40 CFR Part 60 Subpart LL
6.1b	PM-10	EUCOB2	0.04 Pounds Per Hour	Test Protocol	SC 6.6	R336.1205(3), R336.2803, R336.2804, 40 CFR 52.21 Subparts (c) & (d)
* Calculated on a dry gas basis.						

**Visible Emission Limits**

- 6.2 Visible emissions from EUCOB2 shall not exceed a six-minute average of 5 percent opacity.  
[R336.1301, R336.1331, 40 CFR Part 60 Subpart LL]

**Equipment**

- 6.3 The permittee shall not operate EUCOB2 unless the bin vent filter is installed, maintained, and operated in a satisfactory manner. [R336.1205(3), R336.1224, R336.1225, R336.1331, R336.1901, R336.1910, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]
- 6.4 EUCOB2 shall be located within an enclosed building. [R336.1205(3), R336.1224, R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]

**Testing**

- 6.5 Within 60 days after achieving maximum production rate on this process, but not later than 180 days after commencement of trial operation of EUCOB2, the permittee shall evaluate visible emissions from EUCOB2, as required by federal Standards of Performance for New Stationary Sources, at owner's expense, in accordance 40 CFR Part 60 Subparts A and LL. Visible emission observation procedures must have prior approval by the AQD. Verification of visible emissions includes the submittal of a complete report of opacity observations to the AQD within 45 days following the last date of the evaluation. [R 336.1301, 40 CFR Part 60 Subparts A & LL]
- 6.6 Within 60 days after achieving the maximum production rate on this process, but not later than 180 days after commencement of trial operation of EUCOB2, the permittee shall verify PM emission rates from EUCOB2, as required by federal Standards of Performance for New Stationary Sources, by testing at owner's expense, in accordance with 40 CFR Part 60 Subparts A and LL. Stack testing procedures and the location of stack testing ports shall be in accordance with the applicable federal Reference Methods, 40 CFR Part 60 Appendix A. No less than 60 days prior to testing, the permittee shall submit a complete test plan to the AQD. The AQD must approve the final plan prior to testing. Verification of emission rates includes the submittal of a complete report of the test results to the AQD within 45 days following the last date of the test. [40 CFR Part 60 Subpart LL]

**Stack / Vent Restrictions**

6.7 The exhaust gases from EUCOB2 shall not be discharged to the ambient air at any time. [R336.1224, R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]

**The following conditions apply to: EUCEMENTSILO**

**Emission Limits**

	Pollutant	Equipment	Limit	Time Period	Testing/ Monitoring Method	Applicable Requirements
7.1a	PM	EUCEMENTSILO	0.10 lbs per 1000 lbs of exhaust gases*	Test Protocol	General Condition No. 13	R336.1331
7.1b	PM-10	EUCEMENTSILO	0.3 Pounds Per Hour	Test Protocol	General Condition No. 13	R336.2803, R336.2804, 40 CFR 52.21 Subparts (c) & (d)
* Calculated on a dry gas basis.						

**Equipment**

- 7.2 The permittee shall not operate EUCEMENTSILO unless the bin vent filter is installed, maintained, and operated in a satisfactory manner. [R336.1331, R336.1901, R336.1910, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]

**Stack / Vent Restrictions**

	Stack & Vent ID	Maximum Diameter (inches)	Minimum Height Above Ground Level (feet)	Applicable Requirement
7.3	SVCEMENTSILO	20.0	65.5	R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)

**The following conditions apply to: EUFLYASHSILO**

**Emission Limits**

	Pollutant	Equipment	Limit	Time Period	Testing/ Monitoring Method	Applicable Requirements
8.1a	PM	EUFLYASHSILO	0.10 lbs per 1000 lbs of exhaust gases*	Test Protocol	General Condition No. 13	R336.1331
8.1b	PM-10	EUFLYASHSILO	0.3 Pounds Per Hour	Test Protocol	General Condition No. 13	R336.2803, R336.2804, 40 CFR 52.21 Subparts (c) & (d)
* Calculated on a dry gas basis.						

**Equipment**

- 8.2 The permittee shall not operate EUFLYASHSILO unless the bin vent filter is installed, maintained, and operated in a satisfactory manner. [R336.1331, R336.1901, R336.1910, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]

**Stack / Vent Restrictions**

	Stack & Vent ID	Maximum Diameter (inches)	Minimum Height Above Ground Level (feet)	Applicable Requirement
8.3	SVFLYASHSILO	20.0	65.5	R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)

**The following conditions apply to: EUMVAR**

**Emission Limits**

	Pollutant	Equipment	Limit	Time Period	Testing/ Monitoring Method	Applicable Requirements
9.1a	Inorganic PM	EUMVAR	0.00036 lbs per 1000 lbs of exhaust gases*	Test Protocol	SCs 9.5 & 9.8	R336.1205(3), R336.1331
9.1b	Inorganic PM-10	EUMVAR	0.7 Pounds Per Hour	Test Protocol	SCs 9.5 & 9.8	R336.1205(3), R336.2803, R336.2804, 40 CFR 52.21 Subparts (c) & (d)
* Calculated on a dry gas basis.						

**Visible Emission Limits**

9.2 Visible emissions from EUMVAR shall not exceed a six-minute average of 5 percent opacity.  
[R336.1301, R336.1331]

**Process / Operational Limits**

9.3 The permittee shall not operate EUMVAR unless a malfunction abatement plan (MAP) as described in Rule 911(2), for the fabric filter system, has been submitted within 365 days of permit issuance, and is implemented and maintained. The MAP shall, at a minimum, specify the following:

- a) A complete preventative maintenance program including identification of the supervisory personnel responsible for overseeing the inspection, maintenance, and repair of air-cleaning devices, a description of the items or conditions that shall be inspected, the frequency of the inspections or repairs, and an identification of the major replacement parts that shall be maintained in inventory for quick replacement.
- b) An identification of the source and air-cleaning device operating variables that shall be monitored to detect a malfunction or failure, the normal operating range of these variables, and a description of the method of monitoring or surveillance procedures.
- c) A description of the corrective procedures or operational changes that shall be taken in the event of a malfunction or failure to achieve compliance with the applicable emission limits.

If at any time the MAP fails to address or inadequately addresses an event that meets the characteristics of a malfunction, the permittee shall amend the MAP within 45 days after such an event occurs. The permittee shall also amend the MAP within 45 days, if new equipment is installed or upon request from the District Supervisor. The permittee shall submit the MAP and any amendments to the MAP to the AQD District Supervisor for review and approval. If the AQD does not notify the permittee within 90 days of submittal, the MAP or amended MAP shall be considered approved. Until an amended plan is approved, the permittee shall implement corrective procedures or operational changes to achieve compliance with all applicable emission limits.

[R 336.1331, R 336.1901, R 336.1910, R 336.1911, R 336.2803, R 336.2804, 40 CFR 52.21(c) and (d)]

### Equipment

- 9.4 The permittee shall not operate EUMVAR unless the fabric filter system is installed, maintained, and operated in a satisfactory manner. [R336.1331, R336.1901, R336.1910, R 336.2803, R 336.2804, 40 CFR 52.21(c) & (d)]

### Testing

- 9.5 Within 120 days after first achieving an ore production rate of 1660 tons per day but not later than 4 years from the date of permit issuance, the permittee shall verify inorganic PM and PM-10 emission rates from EUMVAR by testing at owner's expense, in accordance with Department requirements using 40 CFR, Part 51, Appendix M, Method 202 or an equivalent method approved by the AQD. Ore production values shall be based upon the ore transport trucks records required by Special Condition Number 10.7. No less than 45 days prior to testing, the permittee shall submit a complete test plan to the AQD. The AQD must approve the final plan prior to testing. Verification of emission rates includes the submittal of a complete report of the test results to the AQD within 60 days following the last date of the test. [R336.1205(3), R336.1331, R336.2001, R336.2003, R336.2004, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]

### Recordkeeping /Reporting /Notification

- 9.6 The permittee shall complete all required calculations in a format acceptable to the AQD District Supervisor and make them available by the 15th day of the calendar month, for the previous calendar month, unless otherwise specified in any recordkeeping, reporting or notification special condition. [R336.1224, R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]
- 9.7 The permittee shall keep, in a satisfactory manner, a log of the monthly hours of operation of EUMVAR by way of logging the main ventilation fan operation. The permittee shall keep all records on file for a period of at least five years and make them available to the Department upon request. [R336.1224, R336.1225, R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]
- 9.8 The permittee shall keep the following information on a monthly basis for EUMVAR:
- a) Inorganic PM-10 emission calculations determining the monthly emission rate in tons per calendar month.
  - b) Inorganic PM-10 emission calculations determining the annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month.

The permittee shall keep the records on file, in a format acceptable to the AQD District Supervisor, for a period of at least five years and make them available to the Department upon request. [R336.1205(3), R336.1224, R336.1225, R336.2803, R336.2804, 40 CFR 52.21 (c) & (d)]

### Stack / Vent Restrictions

	Stack & Vent ID	Maximum Diameter (feet)	Minimum Height Above Ground Level (feet)	Applicable Requirement
9.9	SVMVAR	14.1	65.0	R336.1225, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)
The exhaust gases shall be discharged unobstructed vertically upwards to the ambient air				

**The following conditions apply to: EUFUGITIVES**

**Visible Emission Limits**

- 10.1 Visible emissions from all wheel loaders and all truck traffic shall not exceed five (5) percent opacity. Compliance shall be demonstrated using Test Method 9D as defined in Section 324.5525(j) of Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451). [R 336.1301, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]
- 10.2 Visible emissions from each storage pile shall not exceed five (5) percent opacity. Compliance shall be demonstrated using Test Method 9D as defined in Section 324.5525(j) of Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451). [R336.1224, R336.1225, R 336.1301, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]

**Process / Operational Limits**

- 10.3 The permittee shall not operate the facility unless the program for continuous fugitive emissions control for all plant roadways, the plant yard, all material storage piles, and all material handling operations specified in Appendix A, or an alternate plan approved by the AQD District Supervisor, has been implemented and is maintained. [R336.1224, R336.1225, R336.1371, R336.1372, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]
- 10.4 The permittee shall not exceed a maximum equivalent of 16,856 50-ton ore trucks entering and leaving the facility for each 12-month rolling time period. [R336.1224, R336.1225, R336.1371, R336.1372, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]
- 10.5 The maximum area of uncovered material storage piles that the permittee may maintain at any one time is 8.0 acres. [R336.1224, R336.1225, R336.1371, R336.1372, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]

**Recordkeeping /Reporting /Notification**

- 10.6 The permittee shall complete all required calculations in a format acceptable to the AQD District Supervisor and make them available by the 15th day of the calendar month, for the previous calendar month, unless otherwise specified in any recordkeeping, reporting or notification special condition. [R336.1224, R336.1225, R336.1371, R336.1372, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]
- 10.7 The permittee shall keep a daily record of the type, size (weight) and number of ore transport trucks entering and leaving the facility. Each month, in a manner acceptable to the AQD District Supervisor, the permittee shall calculate an equivalent number of 50-ton ore transport trucks entering and leaving the facility based on that month's daily records. The permittee shall also calculate the equivalent number of 50-ton ore transport trucks entering and leaving the facility per 12-month rolling time period. The permittee shall keep all records and calculations on file for a period of at least five years and make them available to the Department upon request. [R336.1224, R336.1225, R336.1371, R336.1372, R336.1901, R336.2803, R336.2804, 40 CFR 52.21(c) & (d)]

**The following conditions apply to: FGNSPSLL**

**Process / Operational Limits**

- 11.1 The permittee shall comply with all provisions of the federal Standards of Performance for New Stationary Sources as specified in 40 CFR Part 60 Subparts A and LL, as they apply to FGNSPSLL.  
**[40 CFR Part 60 Subparts A & LL]**

**Recordkeeping /Reporting /Notification**

- 11.2 The permittee shall provide written notification of construction and operation of FGNSPSLL to comply with the federal Standards of Performance for New Stationary Sources, 40 CFR 60.7. The permittee shall submit this notification to the AQD District Supervisor within the time frames specified in 40 CFR 60.7. **[40 CFR 60.7]**

## **APPENDIX A**

# **Fugitive Dust Control Plan Kennecott Eagle Minerals Company**

Project ID: 04W018

Prepared by  
**Foth & Van Dyke and Associates, Inc.**

December 2005

# Fugitive Dust Control Plan

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## 1 Introduction

Pursuant to §324.5524 of the Natural Resources and Environmental Protection Act (NREPA), a Fugitive Dust Control Plan is required for any fugitive dust source in Standard Industrial Classification (SIC) group 10. The proposed Eagle Project will be classified as SIC 1021, and therefore will be subject to these requirements. The major requirements for dust control under this statute are the following:

- ♦ Opacity readings for fugitive dust sources at storage piles, roads and material handling activities shall be maintained below 5%. Other fugitive dust sources shall be maintained below 20%. However, these requirements do not apply to storage pile material handling activities when wind speeds are in excess of 25 miles per hour.
- ♦ If certain facilities with total uncontrolled emissions from storage piles in excess of 50 tons per year and the storage piles are located at the facility where total facility emissions are in excess of 100 tons per year, the storage piles will need to either be covered or treated with water or a surfactant solution. Given the facility emissions will be below these levels, this would not be a specific requirement.
- ♦ Crushers, grinding mills, screening operations, conveyor transfer points, storage bins and fine product truck loading operations must include provisions to control dust.
- ♦ Vehicles for transport of bulk materials with a silt content of more than 1% shall employ certain work practices to ensure dust emissions are minimized.
- ♦ The facility will need to develop a Fugitive Dust Control Plan that addresses all fugitive dust sources that are subject to these provisions. The operating program will need to be designed to reduce particulate emissions to the lowest level using control technology that is reasonably achievable. The operating program must be submitted to the state for approval prior to implementation.

This Fugitive Dust Control Plan has been prepared by Foth & Van Dyke on behalf of Kennecott Eagle Minerals Company (KEMC) as part of the Air Permit to Install Application for proposed mining operations at the Eagle Project Site located in Marquette County. As proposed, the surface portion of the mining operations will be conducted at two locations that are situated approximately within one half mile from each other. The larger main site will incorporate most of the surface operations, including management of ore from underground and providing power and heat to the facility. The smaller auxiliary site will include the backfill plant and the ventilation raise. The overall site layout is depicted in Figure A-1 in Appendix 1 to this Plan. Figure A-1 identifies potential sources of fugitive dust that will be associated with the operations. These sources of fugitive dust will include the following:

- ♦ Temporary Development Rock Storage Area
- ♦ Covered Coarse Ore Storage
- ♦ Crusher Building
- ♦ Enclosed Crushed Ore Bins
- ♦ Aggregate Storage Area
- ♦ Covered Aggregate Feed Hopper
- ♦ Enclosed Cement/Fly Ash Mixing Area
- ♦ On-Site Unpaved Roadways

The remainder of this Plan describes in more detail important aspects of the Fugitive Dust Control Plan, including the approximate locations of storage piles, traffic patterns within the facility, controls for loading and unloading operations and information on best management practices to minimize fugitive dust that may be generated during the process.

## 2 Traffic Patterns Within the Facility

The locations of on-site roadways are shown in Figure A-1. A brief description of each significant roadway segment is provided below:

- ♦ Mine Site Access Road – This is the main access road to the site. This road will be used for general traffic into the site, but also for commercial traffic, such as for deliveries of fuel or supplies. However, the main use for this road will be for movement of haul trucks to and from the site to pick-up loads of ore for shipment off-site to customers. As shown on Figure A-1, this road accesses the site from County Road AAA.
- ♦ On-Site Road for Pick-up of Crushed Ore – Once within the site, haul trucks will travel to the Crushed Ore Bins via a route that passes underneath the belt conveyor that leads from the Crusher building to the Crushed Ore Bins. Trucks will load material from one of two storage silos within the structure. Once a truck is loaded, it will move through a truck wheel wash area to remove material from the contact zone before it travels back through the gate and onto the mine site access road.
- ♦ Road from the Portal to Surface Facilities – This road will serve as an access road from the entrance to the mine to areas on the surface. The primary routes from the portal will be either to the Coarse Ore Storage area or the Temporary Development Rock Storage (TDRSA) area.
- ♦ Road from the Coarse Ore Storage to the Crusher – Front end loaders will pick-up and move ore material along this road to the crusher building for processing.
- ♦ Aggregate Storage Area – At the aggregate storage area located approximately one-half mile from the main site is an access road for delivery of cement, fly ash and aggregate. A loader will also transport aggregate material from the storage pile to an aggregate feed hopper for transfer of the material underground for production of a cemented aggregate for use in backfilling primary stopes.

All on-site roadways will be unpaved. The facility has chosen to leave these roads unpaved primarily because of the heavy use these roads will receive from heavy truck traffic. Pavement is anticipated to be too difficult to maintain under these conditions. In addition, the cold climate in this area would contribute further to rapid deterioration of such surfaces. It should be pointed out that snow cover is anticipated to be present approximately four to five months out of the year. This factor alone should keep dust levels to a minimum during these portions of the year. However, to ensure fugitive dust levels are kept to a minimum, the facility has elected to implement certain control measures during drier times of the year. These measures will primarily involve use of a strict watering program to maintain roads in a wet state and use of crushed aggregate to keep silt levels to a minimum. This control program is further described in Section 3 of this Plan.

### **3 On-Site Road Dust Control Program**

As mentioned above in Section 2, a control program will be instituted to minimize fugitive dust generated from on-site truck traffic. During drier times of the year and when freezing conditions are not occurring, the facility will use water on all on-site roadways. This will include the main traffic areas described above in Section 1. The watering program will include use of a watering truck at both mine site locations. The truck will distribute water evenly across the roadways to maintain the roads in a wet state during operational periods of the day when truck and loader traffic may occur. The truck used for the watering program will be maintained at the mine site such that it will be available for use as needed. At present, it is planned to have two shifts for mining operations, operating at 11 hour days. The watering program will be in effect for portions of the surface site where production trucks and front end loaders are moving material on-site. In addition, if haul trucks are moving ore from the site, the watering program will be in effect during these periods as well.

During periods of production traffic, the roadway segments will be evaluated every three hours for the need to apply water. The evaluation will be based on the moistness of the roadway material, weather conditions expected in the upcoming three hour period (temperature, solar intensity, cloud cover, and wind conditions) and whether the roadway will be adequately moist during the upcoming operating period.

The goal of the watering program will be to reduce fugitive dust emissions sufficiently to achieve an opacity of 5% for these sources. The facility will also use crushed aggregate on all on-site roadways to maintain the silt content of the roads at a minimal level. The aggregate will be replaced on an as-needed basis. Included in Appendix B is an On-Site Roadway Watering Documentation Form to be used in documenting water use on roadways. R 324.5524 (3)(c) addresses transporting materials with various ranges of silt content. The materials being transported at the Eagle Mine facility are expected to have silt content routinely less than 1%. Although not necessary under the rule, crushed ore transported off-site will be routinely covered with a hard cover for general reduction of fugitive dust. In general, for any material having silt contents as listed below, the appropriate measures will be employed:

- For materials having silt contents of 20% or more, completely enclosed trucks, tarps, or other covers will be used.
- For materials having silt content between 5% and 20%, tarps, chemical dust suppressants, or watering to maintain a wet surface condition will be employed.
- For materials having silt content between 1% and 5%, trucks will be loaded such that no part of the load in contact with any sideboard, side panel, or rear part of the load comes within six inches of the top part of the truck enclosure.

#### **4 Locations of Storage Piles and Controls**

##### **4.1 *Temporary Development Rock Storage Pile***

As noted on Figure A-1, the TDRSA is the primary storage pile that will be exposed to ambient conditions a portion of the time. It is located in the northwestern portion of the main site. During early portions of the operations, the TDRSA will store development rock from development of mine drifts and excavation of stope areas underground to access the ore body. However, once the underground facility is developed and certain stope areas are mined out, the development rock will be removed from the storage pile and returned underground for use in backfilling secondary stope areas. During the storage period on the surface, a certain percentage of limestone will also be mixed with the rock. It is estimated that approximately 70% of the time, most portions of the storage area will be overlain with a cover to reduce contact with precipitation and to minimize stormwater run-off.

##### **4.2 *Covered Coarse Ore Storage***

As ore is moved from underground through the portal area, it will be transported to the coarse ore storage area. This will be an enclosed storage area with three walls and a roof to not only protect the material from exposure to precipitation, but to reduce the potential of wind impacting this area. Although one side of the structure will be open to allow access for production haul trucks and front end loaders, it is anticipated the enclosure will result in 90% control of any dust emissions from this source. It should also be noted that the material will consist mostly of large chunks of ore rather than finely divided material. From this standpoint, it is anticipated this material should not contribute significantly to fugitive dust emissions and will allow this emission point to meet the opacity requirement of 5%.

##### **4.3 *Aggregate Storage Area***

The aggregate storage area will be located at the surface backfill plant area near the ventilation raise. This facility is situated approximately one-half mile from the main facility. Aggregate will be stored at this site to facilitate movement of the material underground for preparation of a concrete mixture. The concrete mixture will be used to backfill primary stopes that have been depleted of ore.

During the period this material is located at the surface, it is anticipated fugitive dust from this process should be minimal. This is due to the relatively large particle size of this material. Although this storage area will not be covered, dust will be suppressed during certain portions of the year due to the snow pack and freezing weather. However, during dry portions of the year, the pile will be watered at frequent intervals when loaders are removing material from this area to the aggregate feed hopper. It is anticipated that application of these controls will reduce emissions from this area by up to 90%. It is also anticipated these controls will allow the facility to meet the opacity requirements of 5%.

## **5 Material Handling and Transfers**

### **5.1 *Crusher Building***

All operations at the crusher building will be totally enclosed inside a building. This will include transfer of coarse ore to the grizzly and rock breaker, movement through the jaw crusher and transfer by belt conveyor to the crushed ore bins. In addition, the entire building will be ventilated to a baghouse located outside the structure. This control is expected to reduce dust emissions from this area by at least 99%. It should be noted that the crusher unit itself will also be ventilated directly to a wet scrubber. This wet scrubber will be located inside the crusher building. Emissions from the scrubber will in turn be ventilated to the baghouse.

To ensure proper operation of the baghouse, a manometer will be installed on the unit to measure pressure drop across the bags. The baghouse will also be operated within the specifications recommended by the manufacturer. The manometer will be checked and recorded on a daily basis to ensure the control device is operating within these specifications. A regular maintenance program for the baghouse will also be implemented. This program is further described in Section 6. Baghouse inspection and maintenance checklists are provided in Appendix B.

### **5.2 *Enclosed Crushed Ore Bins***

The crushed ore bins area will be enclosed inside a building and material will be stored in one of two storage bins. Bin vents will be located on each of the storage bins that will be controlled with passive fabric filter units. Dust collected in the fabric filter control devices will be returned to the crushed ore bins for inclusion with the crushed ore. It is expected these controls should reduce emissions from the transfer process by up to 99%.

The ore load-out process to trucks will be performed within a partial enclosure. This enclosure along with the relatively large particle size of the material should reduce emissions from the load-out operation by up to 90%. Although all crushed ore materials are expected to contain a silt content of less than 1%, KEMC plans to use tarps or coverings on all trucks used to transport crushed ore materials off-site.

### **5.3 *Cement/Fly Ash Storage Bins***

Two storage bins will be located at the surface backfill plant to contain cement and fly ash material as it is delivered to the site. Delivery trucks will use a pneumatic system to off-load these materials to the bins. Both of the bins will be equipped with bin vents that will use passive fabric filter control to reduce the potential for fugitive dust. Dust collected in the fabric filters will be returned to the storage bins. It is expected that use of a pneumatic transfer system and bin vent filters will reduce emissions from the transfer process by up to 99%.

### **5.4 *Cement/Fly Ash Mixing Area***

Immediately below the two storage bins will be an enclosed cement/fly ash mixing area for transfer of the materials from the bins, mixing and subsequent transfer underground for storage prior to blending with water and aggregate. This entire process will be conducted inside an enclosed building to not only protect the operation from weather, but to reduce fugitive dust as well. Due to the presence of the enclosure, it is anticipated this control mechanism will reduce potential dust emissions by 95%.

### **5.5      *Aggregate Feed Hopper***

Aggregate material stored at the surface backfill plant will be transported as required to the aggregate feed hopper for movement through a bore hole to the underground area. The feed hopper will be partially enclosed on three sides with a roof. Given the relatively large particle size of this material, these controls should reduce emissions from this source by 90%.

## **6 Routine Maintenance**

Sufficient replacement parts and supplies will be kept on-site to replace equipment in the baghouse and wet scrubber that are used to ventilate the crusher and crusher building. These parts and supplies may include spare hoses and bags. This equipment will be available in event a repair is necessary to the control equipment. Visual inspection of the fabric filters will take place at a minimum of once per month. Additional inspections and/or investigations will take place whenever an obvious rip, tear or hole is suspected or observed from a visual inspection. Routine replacement of bags and other equipment will take place on a schedule recommended by the manufacturer. Sample maintenance checklists are included in Appendix 2 to be used as a guide to maintaining the baghouse and wet scrubber.

Sufficient replacement parts and supplies will also be retained on-site for the water truck that is used for watering on-site roadways. The water truck will be serviced on a regular schedule and inspected to ensure equipment is in operable condition.

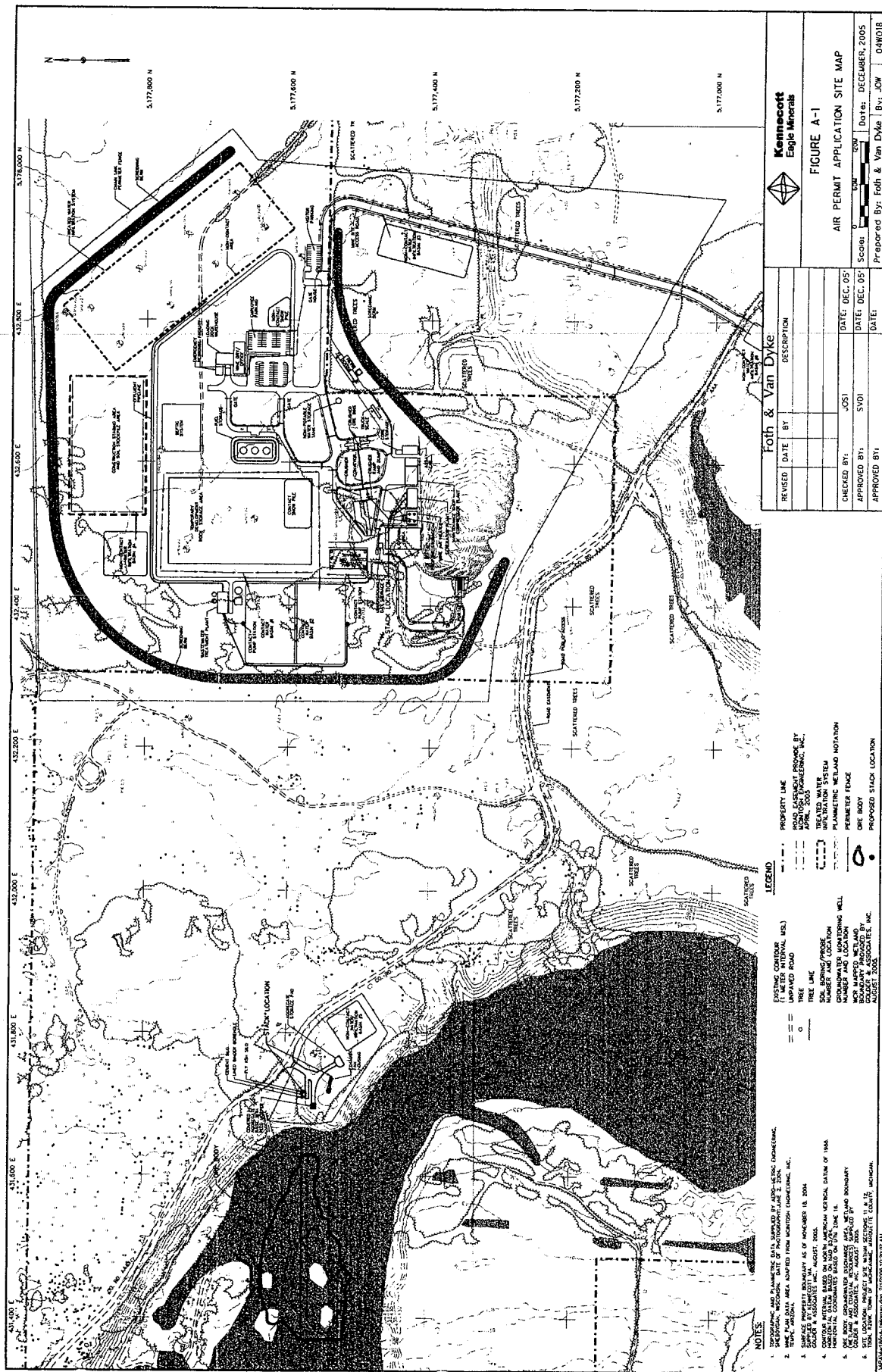
## **7 Recordkeeping**

To ensure the Fugitive Dust Control Plan is effective, records will be maintained for the following activities:

- ♦ Log sheets will be maintained that will record the on-site roadway wetting schedule and approximate volumes of water used. If water is not applied due to precipitation, snow pack or freezing weather, this information should also be recorded on the form. While the intent is for log sheets to be completed on a daily basis for each road segment, it is recognized that during times of the year when snow cover is on the ground, the watering program will not be in effect. Once a permanent snow cover is established late in the fall, a note will be made on the form to that effect in the "Comments" section, and further forms will not be completed over the winter until roads are exposed in the spring. At that point, recordkeeping will resume with log sheets being completed on a daily basis.
- ♦ Log sheets will also be maintained on-site to document daily inspections of pressure drop across the baghouse and wet scrubber. A section of the form will also document what action was taken if either the baghouse or wet scrubber were determined to be not within the operating specifications.
- ♦ Inspection sheets will be maintained on-site that document periodic maintenance inspections of the baghouse and scrubber, including replacement of bags or other pertinent equipment that are associated with proper operation of either the baghouse or scrubber unit. Inspection intervals will be as specified on the forms for each listed task.

Copies of these inspection forms are found in Appendix 2.

## Appendix 1



## Appendix 2

### Inspection Forms On-Site Roadway Watering Documentation Form

Date: \_\_\_\_\_

Name of On-Site Roadway Segment: \_\_\_\_\_

Name of Employee: \_\_\_\_\_

1. Was watering applied to this segment on this day? Yes \_\_\_\_\_

No \_\_\_\_\_

2. If yes to the above, what was the watering schedule?

First Shift \_\_\_\_\_

Second Shift \_\_\_\_\_

3. What was the approximate volume of water used?

Gallons \_\_\_\_\_

4. If water was not used, identify the reason:

Precipitation  
\_\_\_\_\_

Snow Pack or Freezing Conditions  
\_\_\_\_\_

No traffic during the entire period  
\_\_\_\_\_

Comments:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Baghouse Pressure Drop Inspection Checklist**

Date of Inspection: \_\_\_\_\_

Name of Inspector: \_\_\_\_\_

Baghouse Manometer Reading: \_\_\_\_\_ inches of water

1. Was baghouse manometer reading within manufacturer's specifications? Yes \_\_\_\_\_

No \_\_\_\_\_

2. If not, was corrective action performed to determine cause of the malfunction?  
(Describe results of the investigation in the Comments section below)

Yes \_\_\_\_\_

No \_\_\_\_\_

3. Were there any visible emissions from the baghouse?  
(If yes, describe below in the Comments section the corrective action that was taken)

Yes \_\_\_\_\_

No \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### Baghouse Maintenance Checklist

Date of Inspection: \_\_\_\_\_

Name of Inspector: \_\_\_\_\_

#### Daily Maintenance

1. Check pressure drop \_\_\_\_\_
2. Monitor gas flow rate \_\_\_\_\_
3. Observe Stack outlet visually \_\_\_\_\_
4. Walk through baghouse area to check for abnormal and audible conditions \_\_\_\_\_

#### Weekly Maintenance

1. Check all moving parts on the discharge system \_\_\_\_\_
2. Check damper operation; bypass, isolation, etc. \_\_\_\_\_
3. Spot check bag tensioning for reverse-air and shaker bags \_\_\_\_\_
4. Check compressed air lines including line oilers and filters \_\_\_\_\_
5. Blow out any dust from manometer lines \_\_\_\_\_
6. Verify temperature-indicating equipment \_\_\_\_\_
7. Check bag-cleaning sequence to see that all valves are seating properly \_\_\_\_\_
8. Check drive components on fan \_\_\_\_\_

#### Monthly Maintenance

1. Spot check bag-seating condition \_\_\_\_\_
2. Check fan for corrosion and blade wear \_\_\_\_\_
3. Check all hoses and clamps \_\_\_\_\_
4. Spot check for bag leaks and holes \_\_\_\_\_

**Quarterly Maintenance**

1. Thoroughly inspect bags \_\_\_\_\_
2. Check dust for dust buildup \_\_\_\_\_
3. Observe damper valves for proper seating \_\_\_\_\_
4. Check gaskets on all doors \_\_\_\_\_
5. Inspect baffle plate for wear \_\_\_\_\_

**Annual Maintenance**

1. Check all welds and bolts \_\_\_\_\_
2. Check hopper for wear \_\_\_\_\_
3. Replace high-wear parts on cleaning system \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### Wet Scrubber Inspection Checklist

Date of Inspection: \_\_\_\_\_

Name of Inspector: \_\_\_\_\_

Wet Scrubber Manometer Reading: \_\_\_\_\_ inches of water

Scrubbing Liquid Flow Rate \_\_\_\_\_ gallons per minute

1. Was wet scrubber manometer reading within manufacturer's specifications? Yes \_\_\_\_\_

No \_\_\_\_\_

2. Was scrubbing liquid flow rate within manufacturer's specifications? Yes \_\_\_\_\_

No \_\_\_\_\_

3. If "no" to either (1) or (2), was corrective action performed to determine cause of the malfunction?  
(Describe results of the investigation in the Comments section below)

Yes \_\_\_\_\_

No \_\_\_\_\_

4. Were there any visible emissions from the scrubber?

(If yes, describe below in the Comments section the corrective action that was taken)

Yes \_\_\_\_\_

No \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### Wet Scrubber Maintenance Checklist

Date of Inspection: \_\_\_\_\_

Name of Inspector: \_\_\_\_\_

#### Daily Maintenance

1. Check pressure drop \_\_\_\_\_
2. Monitor scrubber liquid flow rate \_\_\_\_\_
3. Observe Stack outlet visually \_\_\_\_\_
4. Walk through scrubber area to check for abnormal and audible conditions \_\_\_\_\_

#### Weekly Maintenance

1. Check pump and fan motor for unusual vibration, noise or heat \_\_\_\_\_
2. Inspect system for leaks \_\_\_\_\_
3. Check system dampers for proper operation \_\_\_\_\_

#### Monthly Maintenance

1. Inspect spray nozzle distribution pattern \_\_\_\_\_
2. Inspect/clean flow strainer \_\_\_\_\_
3. Check fan housing drain \_\_\_\_\_
4. Check condition of fan bearings, belts and seals \_\_\_\_\_
5. Inspect fan impeller and blades for solids buildup or erosion \_\_\_\_\_

#### Quarterly Maintenance

5. Inspect packing for breakage and settling \_\_\_\_\_
6. Check piping for erosion or plugging \_\_\_\_\_

**Annual Maintenance**

1. Calibrate instrumentation for monitoring pressure drop and liquid flow rate \_\_\_\_\_
2. Inspect sump, packing and ductwork for solids buildup \_\_\_\_\_
3. Inspect tower internals for corrosion or breakage \_\_\_\_\_
4. Inspect ductwork, fan and structural supports for deterioration/damage \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_